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भारतीय मानक

फ्लॉपी डिस्क ड्राइव — विशिष्टि

Indian Standard

FLOPPY DISK DRIVE — SPECIFICATION

ICS 35.220.21

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2001

Price Group 3

Computer Hardware Sectional Committee, LTD 37

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Computer Hardware Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

The objective of this standard is to lay down performance requirements of Floppy Disk Drive of size — 5.25 inch and 3.5 inch for use with personal computers. The parameters have been so chosen as to ensure quality and reliability and at the same time, provide sufficient flexibility in design by the manufacturers. This standard is designed to serve the public interest through eliminating communication gap between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in obtaining with minimum delay the proper products for his/her particular need.

Some additional information on Floppy Disk Drive is given in Annex B.

There is no IEC standard on this subject. The technical committee responsible for the preparation of this standard has reviewed the provisions of the following IEC Publication and has decided that it may be used in conjunction with this standard to carry out tests given in **6.2**(c) of this standard till Indian Standard on this subject is published.

> IEC 61000-4-5-(1995) Electromagnetic Compatibility (EMC) — Part 4 : Testing and measurement techniques — Section 5: Surge immunity test

The composition of the Committee responsible for formulation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

FLOPPY DISK DRIVE — SPECIFICATION

1 SCOPE

1.1 This standard prescribes general and performance requirements for Floppy Disk Drive (FDD) to be used with personal computers for the data storage applications.

2 REFERENCES

2.1 The Indian Standards indicated in Annex A contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

3.1 For the purpose of this standard, the terms and definitions given in IS 1885 (Part 52) shall apply in addition to the following:

3.1.1 *Type Tests*

Tests carried out to prove conformity with the requirements of this standard. These are intended to prove the general quality and design of a particular type of FDD.

3.1.2 *Acceptance Tests*

Tests carried out on samples of FDD selected from a lot for the purpose of acceptance of the lot.

3.1.2.1 *Lot*

All Floppy Disk Drives of the same model and type having the same design and manufactured by the same technique under essentially similar conditions of production.

3.1.3 *Routine Tests*

Tests carried out on each FDD by the manufacturer in order to check the essential requirements which are likely to vary during production.

4 GENERAL REQUIREMENTS

4.1 Physical and power supply requirements shall be as given in Table 1.

5 SAFETY REQUIREMENTS

5.1 The FDD shall conform to safety requirements. These tests shall be carried out in accordance with IS 13252 and shall meet the requirements specified therein.

Table 1 General Requirements

(*Clauses* 4.1, 10.2 *and* 10.4.1)

Sl No. (1)	Parameters (2)	Requirements (3)
i)	Visual examination	The Floppy Disk Drive shall be in normal working conditions. It shall be examined for workmanship and finish
ii)	Power supply	a) 12 V d.c. ± 10% b) 5 V d.c. ± 5%
iii)	Power consumption	
	a) Starting current	1.5 A, *Max*
	b) Maximum operating current	500 mA (for 12V d.c.) 600 mA (for 5V d.c.)
iv)	Ripple voltage allowance (including spike noise):	
	For 12 V d.c.	Less than 150 mV *p-p*
	For 5 V d.c.	Less than 50 mV *p-p*
v)	Insulation resistance	Not less than 80 kΩ at 25 V (between frame ground and signal ground)
vi)	Power interrupt response	The Floppy Disk Drive shall meet the functional performance requirements after the following sequence: a) Switch on the power b) Interrupt power to the FDD 100 times at the rate of 6 operations per minute c) Check functional performance.

5.2 Earth leakage current test shall be carried out according to **5.2** of IS 13252.

6 EMI/EMC REQUIREMENTS

6.1 The conducted emission and the radiated emission shall be limited to the requirements specified in Table 2, Table 4 and Table 6 for Class B equipment in IS 6873(Part 7).

6.2 Conducted Susceptibility Test

The following tests shall be carried out:

a) Electrostatic discharge test — As per IS 14700 (Part 4/Sec 2),

b) Electrical fast transient/burst test — As per IS 14700 (Part 4/Sec 4), and

c) Surge/Spike test — As per IEC 61000 (Part 4/Sec 5).

7 PERFORMANCE REQUIREMENTS

7.1 The Floppy Disk Drive shall meet performance requirements as laid down in Table 2.

Table 2 Performance Requirements

(*Clauses* 7.1 *and* 10.4.1)

Sl No.	Parameters	Requirements		
		360 KB 5.25 inch	1.2 MB 5.25 inch	1.44 MB 3.5 inch
(1)	(2)	(3)	(4)	(5)
i)	Formatted capacity (Sectors/track)			
		a) 327.7 KB (16)	1 025 KB (26)	1 311 KB (32)
		b) 368.6 KB (9)	1 183 KB (15)	1 475 KB (18)
		c) 409.6 KB (5)	1 262 KB (8)	1 638 KB (10)
ii)	Recording density	5876 bpi	9646 bpi	17 434 bpi
iii)	Track density	48 tpi	96 tpi	135 tpi
iv)	Tracks/side	40	80	80
v)	Recording method	MFM	MFM	MFM
vi)	Rotational speed	300 rpm	300/360 rpm	300 rpm
	a) Long-term speed variation	± 1.5%	± 1.5%	± 1.5%
	b) Instantaneous speed variation	± 1.5%	± 1.5%	± 1.5%
vii)	Average latency time	100 ms	10 ms	100 ms
viii)	Access time, *Max*			
	a) Single track seek time	6 ms	3 ms	3 ms
	b) Average access time	93 ms	93 ms	93 ms
	c) Setting time	15 ms	15 ms	15 ms
ix)	Time taken from "Power On" to "Ready"	400 ms	400 ms	400 ms
x)	Rate of data transfer	250 K bits/s	500 K bits/s	500 K bits/s

7.2 Error Rate

a) Soft read error	1 per 10^9 bit read (with 2 retries)
b) Hard read error	1 per 10^{12} bit read (with 10 retries)
c) Seek error	1 per 10^6 time seek

NOTE — These tests are also conducted as end point measurement after all the tests are completed under each group. There should not be any change in error rate.

8 MARKING

8.1 Each Floppy Disk Drive shall be legibly and indelibly marked with the following information:

a) Model designation and serial number;
b) Manufacturer's name or trade-mark;
c) Capacity of drive and diskette type;
d) Country of manufacturer; and
e) Any other related marking.

Compliance shall be checked by inspection and by rubbing the marking by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with kerosene. After the test the marking shall be legible, it shall not be easily possible to remove marking plates and they shall show no curling.

8.2 The Floppy Disk Drive may also be marked with the Standard Mark.

8.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 1986 and the rules and regulations made thereunder. The details of conditions under which a license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

9 OPERATING AND INSTRUCTION MANUAL

9.1 An operating and instruction manual containing information related to installation, operation, routine maintenance and safety precautions may be made available with each FDD.

9.2 Maintenance agency should be provided with circuit diagrams, with components/parts identification list and layout.

10 TESTS

10.1 Type Tests

The tests specified in Table 3 shall constitute type tests and shall be carried out in the sequence mentioned therein.

10.1.1 *Number of Samples*

For type tests, number of samples should be 4 of the same model, type and make selected at random from a regular production lot and shall be distributed for various groups as specified in Table 3.

10.1.2 *Criteria for Acceptance*

There shall be no failure in any of the type tests. In case of failure, twice the number shall be taken and subjected to the tests in which failure has occurred and other test that has bearing on test results. No failure is permitted in the retests.

10.2 Routine Tests

The following shall constitute the routine tests and shall be carried out on each and every FDD.

a) Visual examination as per Sl No. (i) of Table 1.
b) Power supply requirements as per Sl No. (ii) and (iii) of Table 1.
c) Performance requirements as per **7**.
d) Safety tests as per **5**.

10.3 Acceptance Tests

The following shall constitute acceptance tests which shall be carried out on FDD that have successfully undergone routine tests as given in **10.2**. Single sampling plan, inspection level S2, AQL 2.5 of IS 10673 shall apply.

a) Group 0 tests as per Table 3.
b) Endurance (life) electrical tests for 166 h as given in **10.5.2**.

Table 3 Schedule of Type Tests

(*Clauses* 10.1, 10.1.1 *and* 10.3)

Group (1)	Test (2)	Clause/Table Reference (3)	No. of Samples (4)
0	Check for general requirements	4.1	4
	Check for performance requirements	Table 2	
	Check for EMI/EMC requirements	6	
	Check for safety requirements	5	
	Check for marking requirements	8	
1	Drop (free fall) test	10.4.4	1
	Bump test	10.4.2	
2	Vibration test	10.4.3	1
	Dry heat test	10.4.5	
	Damp heat test	10.4.6	
	Cold test	10.4.7	
3	Endurance test (mechanical)	10.5.1	1
	Endurance test (electrical)	10.5.2	2

NOTE — The tests given in this table are of non-destructive type.

10.4 Environmental Tests

10.4.1 The following tests are to be conducted with FDD in non-operational state. On completion of each environmental and endurance (life) test discussed below, the FDD should satisfy the requirement of the following tests, after recovery period (wherever applicable).

a) Visual examination as per Sl No. (i) of Table 1.
b) Maximum operating current as per Sl No. [iii (b)] of Table 1.
c) Insulation resistance as per Sl No. (v) of Table 1.
d) Rotational speed as per Sl No. (vi) of Table 2.
e) Earth leakage current as per **5.2** of IS 13252.
f) Rate of data transfer as per Sl No. (x) of Table 2.

10.4.2 *Bump Test*

The FDD shall be subjected to the test in accordance with IS 9000 (Part 7/Sec 2). The number of bumps shall be 1 000 at acceleration 40 *g*. The equipment should be in packed condition.

10.4.3 *Vibration Test*

The FDD shall be subjected to the vibration test in accordance with IS 9000 (Part 8). The following details are applicable.

Frequency : 10 to 55 Hz
Acceleration : 1 *g*
Duration : 45 min (on each axis x, y, z)

10.4.4 *Drop Test*

The FDD shall be subjected to free fall test at a height of 25 mm in accordance with IS 9000 (Part 7/Sec 3). The number of drops shall be 8 (4 corners + 4 edges) in unpacked condition.

10.4.5 *Dry Heat Test*

The FDD in unpacked condition with power OFF shall be subjected to dry heat test in accordance with IS 9000 (Part 3/Sec 5), at a temperature severity of 55°C for 16 h. The duration of recovery shall be 2 h.

10.4.6 *Damp Heat Cyclic Test*

The FDD in unpacked condition with power OFF shall be subjected to damp heat cyclic test in accordance with IS 9000 (Part 5/Sec 1) at a temperature of 40°C and 90 percent relative humidity. The number of cycles shall be 2. The duration of recovery shall be 2 h. The value of insulation resistance shall not be less than 50 percent of the original value after recovery.

10.4.7 *Cold Test*

The FDD in unpacked condition with power OFF shall be subjected to cold test in accordance with IS 9000 (Part 2/Sec 4), at a severity of −10°C for 2 h. The duration of recovery shall be 1 h.

10.5 Endurance (Life) Test

10.5.1 *Endurance Test (Mechanical)*

The FDD shall be tested in accordance with IS 9185 (Part 2). The media shall be inserted 4 to 6 times per minute with half an hour idle period for every two hours of operation. The total media insertion shall not be less than 30 000 times. The FDD shall be checked for normal working by testing for read/write operations on the innermost and outermost tracks after every 7 500 insertions.

10.5.2 *Endurance Test (Electrical)*

The FDD shall be subjected to an operating life test consisting of 2 h of operation and half an hour OFF period for a total operating period of 1 000 h. Allowance shall be given for normal function such as change of diskettes.

ANNEX A

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
1885 (Part 52) : 1980	Electrotechnical vocabulary: Part 52 Data processing
6873 (Part 7) : 1999	Limits and methods of measurements of radio disturbance characteristics: Part 7 Information technology equipment (*first revision*)
9000	Basic environmental testing procedures for electronic and electrical items:
(Part 2/Sec 4) : 1977	Cold test, Section 4 Cold test for heat dissipating items with gradual change of temperature
(Part 3/Sec 5) : 1977	Dry heat test, Section 5 Dry heat test for heat dissipating items with gradual change of temperature
(Part 5/Sec 1) : 1981	Damp heat (cyclic) test, Section 1 16 + 8h cycle
(Part 7/Sec 2) : 1979	Impact test, Section 2 Bump
(Part 7/Sec 3) : 1979	Impact test, Section 3 Drop and topple
(Part 8) : 1981	Vibration (sinusoidal) test
9185 (Part 2) : 1979	Endurance (life) test for electronic and electrical components: Part 2 Mechanical endurance
10673 : 1983	Sampling plans and procedures for inspection by attributes for electronic items
13252 : 1992	Safety of information technology equipment including electrical business equipment
14700	Electromagnetic compatibility (EMC):
(Part 4/Sec 2) : 1999	Testing and measurement techniques, Section 2 Electrostatic discharge immunity test
(Part 4/Sec 4) : 1999	Testing and measurement techniques, Section 4 Electrical fast transient/burst immunity test

ANNEX B

(*Foreword*)

ADDITIONAL INFORMATION ON FLOPPY DISK DRIVE

B-1 PHYSICAL INTERFACE

The electrical interface between the floppy disk and the host system is via three connectors. The first connector is used for signals, the second connector for power and the third connector (push on terminal) makes a frame ground. The first connector is a 34 pin PCB edge connector. The d.c. power connector is a 4 pin connector. The third connector (frame ground) is secured by a screw and washer to the castling at the rear of the drive.

NOTE — Sufficiently large gauge of wire may be used to ensure 10 mV, *Max* voltage drop for every 30 cm of power cable. The minimum gauge of copper wire AWG 18 should be used.

B-2 INTERFACE LINES

The interface of the FDD can be divided into the following two categories.

a) Signal, and
b) d.c. power.

The signal interface consists of the following two parts:

a) Control, and
b) Data transfer.

All lines in the signal interface are digital in nature and either provide signals to the drive (input) or provide signals to the host output via interface connector.

B-3 FRAME GROUND

The drive frame must be grounded. If drive is incorporated into a battery powered portable system, then d.c. ground may be connected to the earth. If system derives the power directly from the mains, then the third wire shall be grounded.

B-4 FORMAT OF DATA RECORDING

The format of the data recorded on the diskette is totally a function of the host system namely, CPU, FDD and the floppy disk. These formats can be designed around the user's application to take maximum advantage of the total available bits that can be written on any one track.

ANNEX C

(Foreword)

COMMITTEE COMPOSITION

Computer Hardware Sectional Committee, LTD 37

Organization	*Representative(s)*
Electronics Corporation of India Limited, Hyderabad	SHRI C. D. MURTY (***Chairman***)
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